REMARKS

This Amendment is fully responsive to the final Office Action dated August 24, 2007, issued in connection with the above-identified application. Claims 1, 3-12 and 14-20 were all the claims previously pending in the application. With this Amendment, claims 3, 4, 14 and 15 have been canceled without prejudice or disclaimer to the subject matter therein; and claims 1, 5, 9-12, and 16-20 have been amended. Accordingly, claims 1, 5-12 and 16-20 are all the claims now pending in the application. No new matter has been added by this Amendment. Favorable reconsideration is respectfully requested.

In the Office Action, claims 1, 3, 4, 8, 10, 12, 14, 15 and 20 have been rejected under 35 USC 102(b) as being anticipated by Aarts et al. (U.S. Patent No. 6,111,960, hereafter "Aarts-A").

The Applicants have canceled claims 3, 4 and 14 and 15 rending the rejection to those claims moot. Additionally, independent claims 1 and 12 have been amended to further distinguish the present invention from the cited prior art. Claim 1 recites, in relevant part, the following:

"An audio-signal-processing apparatus for processing input-audio-signals, each input-audio-signal comprising a musical sound that includes a fundamental-tone having a first frequency, and a harmonic-tone having a second frequency that is an integral multiple frequency of the first frequency, said apparatus comprising:

a band-decomposition unit operable to decompose a low frequency component of the input-audio-signals into a first frequency band and a second frequency band, the first frequency band and the second frequency band being different frequency bands, and the fundamental-tone being included in the first frequency band and the harmonic-tone being included in the second frequency band;

a harmonic-series-generating unit operable to generate a harmonic-tone component for the fundamental-tone included in the first frequency band, and a harmonic-tone component for the harmonic-tone included in the second frequency band;...,

wherein a bandwidth of the first frequency band and a bandwidth of the second frequency band are defined based on at least one of a lowest fundamental frequency of the musical sound and a low interval limit."

The features of claim 1 noted above are similarly recited in independent claim 12.

Specifically, claim 12 is a corresponding method for performing the features of the apparatus of claim 1.

In the Office Action, the Examiner relies on Aarts-A for disclosing the features of claims 1 and 12. In particular, the Examiner relied on Fig. 9 for disclosing the features noted above in claim 1, and similarly recited in claim 12.

Aarts-A discloses a system for processing an audio signal, in which different frequency bands are selected for processing the audio signal. In Fig. 9 of Aarts-A, the system includes adjacent bandpass filters (20A-20N), such that each bandpass filter is configured to select a 10 hertz band (e.g., 0-10 hertz, 10-20 hertz, 20-30 hertz, etc.). As described in the Aarts-A, the adjacent bandpass filters (20A-20N) are implemented to avoid intermodulation distortion, which occurs during the generation of harmonic frequencies (see col. 9, lines 3-23). However, claims 1 and 12, as amended, are distinguishable over Aarts-A for at least the reasons noted below.

First, the system in Fig. 9 of Aarts-A does not appear to process a complex musical sound that includes a fundamental-tone and a harmonic-tone. Specifically, the bandpass filters illustrated in Fig. 9 (e.g., 20A-20N) divide an input frequency spectrum into small bands, wherein a separate harmonic generator is assigned to each band. Thus, at best, Aarts-A only discloses a system for processing an audio-signal that includes a variety of frequencies into small bands. On the other hand, claims 1 and 12 (as amended) describe an audio-signal-processing apparatus (or method) for processing input-audio-signals, wherein each input-audio-signal comprising a musical sound that includes a fundamental-tone having a first frequency, and a harmonic-tone having a second frequency that is an integral multiple frequency of the first frequency. The system in Fig. 9 of Aarts-A does not appear to disclose or suggest how to processes the complex musical sounds processed by apparatus and method respectively in claims 1 and 12 (as amended).

Second, the band-decomposition unit or method disclosed in Aarts-A (i.e., bandpass filters 20A-20N) does not appear to decompose a low frequency component of input audio signals such that the fundamental-tone and harmonic-tone are placed in different bands. Specifically, in Arts-A, the bandpass filters in Fig. 9 (20A-20D) are described as having bandpass characteristics and being adjacent to each other for selecting frequency bands. For example, bandpass filter 20A may select frequencies from 20-30 Hz, bandpass filter 20B may select frequencies from 30-40 Hz and bandpass

filter 20C may select frequencies from 40-50 Hz (see col. 9, lines 15-19).

Thus, as noted above, Aarts-A only discloses a system for processing an audio-signal that includes a variety of frequencies into small bands. Aarts-A is silent with regard to decomposing a low frequency component of the input-audio-signals into a first frequency band and a second frequency band (the first frequency band and the second frequency band being different frequency bands), wherein the fundamental-tone is included in the first frequency band and the harmonic-tone is included in the second frequency band, as in claims 1 and 12 (as amended).

Third, as noted above, Aarts-A fails to disclose a band-decomposition unit or method that decomposing a low frequency component of the input-audio-signals into a first frequency band and a second frequency band (the first frequency band and the second frequency band being different frequency bands), wherein the fundamental-tone is included in the first frequency band and the harmonic-tone is included in the second frequency band. Thus, it logically follows that Aarts-A also fails to disclose a harmonic-series-generating unit or method for generating harmonic-tone components based on the decomposition performed by the band-decomposition unit, as in claims 1 and 12 (as amended).

Finally, Aarts-A fails to disclose or suggest that the bandpass filters in Fig. 9 (20A-20N) create bands or bandwidths of frequencies based on at least one of a lowest fundamental frequency of the musical sound and a low interval limit. Aarts-A only discloses that the bandpass filters (20A-20N) have bandpass characteristics to divide an input frequency spectrum into small bands.

Based on the foregoing, independent claims 1 and 12 (as amended) are not anticipated by Aarts-A. Thus, independent claims 1 and 12 are patentably distinguishable over Aarts-A. Likewise, claims 8, 10 and 20 are patentably distinguished over Aarts-A based at least on their dependency from independent claims 1 and 12.

In the Office Action, claim 11 has been rejected under 35 USC 102(b) as being anticipated by Klayman (U.S. Patent No. 6,285,767, hereafter "Klayman"). Claim 11 has been amended to similarly recite the features of independent claims 1 and 12. Specifically, claim 11 recites, in relevant part, the following:

"An audio-signal-processing apparatus for processing input-audio-signals, each input-audio-signal comprising a musical sound that includes a fundamental-tone having a first

frequency, and a harmonic-tone having a second frequency that is an integral multiple frequency of the first frequency, said apparatus comprising:...

a band-decomposition unit operable to decompose a low frequency component of the input-audio-signals into a first frequency band and a second frequency band, the first frequency band and the second frequency band being different frequency bands, and the fundamental tone being included in the first frequency band and the harmonic-tone being included in the second frequency band;

a harmonic-series-generating unit operable to generate a harmonic-tone component for the fundamental-tone included in the first frequency band, and a harmonic-tone component for the harmonic-tone included in the second frequency band;...,

wherein a bandwidth of the first frequency band and a bandwidth of second frequency band are defined based on at least one of a lowest fundamental frequency of the musical sound and a low interval limit."

In the Office Action, the Examiner relies on Klayman for disclosing the features recited in claim 11. Specifically, the Examiner relied on Fig. 8 of Klayman for disclosing the feature noted above in claim 11.

Klayman discloses an audio enhancement apparatus that spectrally shapes harmonics for low frequency components of an audio signal. As described, this shaping technique is performed so that when the audio signals are reproduced by a speaker, the speaker appears to have more acoustic bandwidth. However, Fig. 8 of Klayman merely illustrates a lowpass filter (810) and staggered bandpass filters (812-815), wherein the bandpass filters (i.e., 812-815) are tuned to a single frequency (e.g., 100 hertz, 150 hertz, 200 hertz, etc.). Additionally, Klayman fails to disclose or suggest the following features of claim 11 (as amended):

1. an audio-signal-processing apparatus for processing input-audio-signals, wherein each input-audio-signal comprising a musical sound that includes a fundamental-tone having a first frequency, and a harmonic-tone having a second frequency that is an integral multiple frequency of the first frequency;
2. a band-decomposition unit operable to decompose a low frequency component of the input-audio-signals into a first frequency band and a second frequency band, the first

frequency band and the second frequency band being different frequency bands, and the fundamental-tone being included in the first frequency band and the harmonic-tone being included in the second frequency band;

3. a harmonic-series-generating unit operable to generate harmonic-tone components based on the decomposing performed by the band-decomposition unit; and

4. a bandwidth of the first frequency band and a bandwidth of the second frequency band are defined based on at least one of a lowest fundamental frequency of the musical sound and a low interval limit.

Based on the above discussion, independent claim 11 is not anticipated by Klayman. Thus, claim 11 is patentably distinguished over Klayman.

In the Office Action, claims 5-7 and 16-18 have been rejected under 35 USC 103(a) as being unpatentable over Aarts-A; and claims 9 and 19 have been rejected under 35 USC 103(a) as being unpatentable over Aarts-A in view of Aarts et al. (U.S. Patent No. 6,961,435, hereafter "Aart-B").

Claim 5 has been canceled rending the rejection to that claim moot. Additionally, claims 6, 7 and 9 depend from independent claim 1; and claims 16-18 and 19 depend from independent claim 12. As noted above, Aarts-A fails to disclose or suggest all the features of claims 1 and 12 (as amended). Additionally, Aarts-B fails to overcome the deficiencies noted Aarts-A. Specifically, Aarts-B merely discloses a bandwidth extension device that implements the use of two bandpass filters BPF11, BPF12 and two harmonic generators HG1, HG2 for producing two separate streams of harmonics of selected frequency bands (see, e.g., col. 2 lines 6-24).

Accordingly, no obvious modification to or combination of Aarts-A and Aarts-A in view of Aarts-B would result in, or otherwise render obvious, independent claims 1 and 12, from which claims 5-7, 9, 16-18 and 19 respectively depend. Accordingly, claims 5-7, 9, 16-18 and 19 are patentably distinguished over Aarts-A and Aarts-A in view of Aarts-B.

Based on the foregoing, the Applicants respectfully submit that all the pending claims are patentable over the prior art of record. Thus, the Applicants respectfully request that the Examiner withdraw the rejections presented in the Office Action dated August 24, 2007, and pass the application to issue.

The Examiner is invited to contact the undersigned attorney by telephone to resolve any remaining issues.

Respectfully submitted,

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